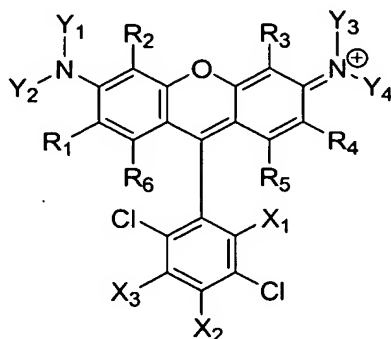


## CLAIMS

### What Is Claimed Is:

1. A compound having the formula:



- 5            wherein:

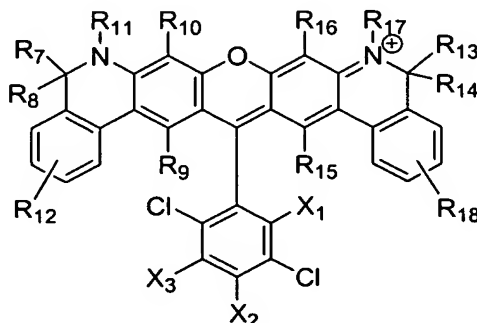
$R_1$ - $R_6$  taken separately are selected from the group consisting of hydrogen, fluorine, chlorine, lower alkyl, lower alkene, lower alkyne, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy, linking group, and combinations thereof, or, when taken together,  $R_1$  and  $R_6$  is benzo, or, when taken together,  $R_4$  and  $R_5$  is

- 10        benzo;

$Y_1$ - $Y_4$  taken separately are selected from the group consisting of hydrogen, lower alkyl, alkyl sulfonate, alkyl carboxylate, and cycloalkyl, or, when taken together,  $Y_1$  and  $R_2$ ,  $Y_2$  and  $R_1$ ,  $Y_3$  and  $R_3$ , and/or  $Y_4$  and  $R_4$  is propano, ethano, or substituted forms thereof; and

- 15             $X_1$ - $X_3$  taken separately are selected from the group consisting of hydrogen, chlorine, fluorine, lower alkyl, amine, amide, carboxylate, sulfonate, hydroxymethyl, and linking group.

2. A compound having the formula:



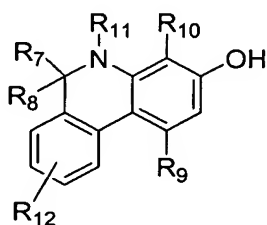
wherein:

- R<sub>7</sub>-R<sub>10</sub>, R<sub>12</sub>-R<sub>16</sub>, and R<sub>18</sub> taken separately are selected from the group consisting of hydrogen, fluorine, chlorine, methyl, ethyl, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy, linking group, or combinations thereof;

R<sub>11</sub> and R<sub>17</sub> taken separately are selected from the group consisting of hydrogen, lower alkyl, alkyl sulfonate, alkyl carboxylate, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, linking group, or combinations thereof; and

- X<sub>1</sub>-X<sub>3</sub> taken separately are selected from the group consisting of hydrogen, chlorine, fluorine, lower alkyl, amine, amide, carboxylate, sulfonate, hydroxymethyl, and linking group.

3. A compound having the formula:

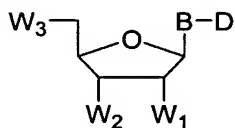


wherein:

- R<sub>7</sub>-R<sub>10</sub>, R<sub>12</sub> taken separately are selected from the group consisting of hydrogen, fluorine, chlorine, methyl, ethyl, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy, linking group, or combinations thereof; and

- R<sub>11</sub> taken separately is selected from the group consisting of hydrogen, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, linking group, or combinations thereof.

4. A labeled nucleotide having the formula:



wherein:

- D is the dye compound of Claim 1 or Claim 2;

B is a 7-deazapurine, purine, or pyrimidine nucleotide base;

$W_1$  and  $W_2$  taken separately are selected from the group consisting of H and OH;

$W_3$  is selected from the group consisting of OH,  $OPO_3$ ,  $OP_2O_6$ ,  $OP_3O_9$ , and  
5 analogs thereof;

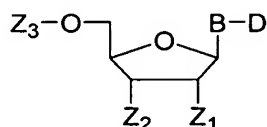
wherein when B is purine or 7-deazapurine, the sugar moiety is attached at the  $N^9$ -position of the purine or deazapurine, and when B is pyrimidine, the sugar moiety is attached at the  $N^1$ -position of the pyrimidine;

wherein the linkage linking B and D is attached to D at one of positions  $R_1$ -  
10  $R_{18}$  or  $X_1$ - $X_3$ ; and

wherein if B is a purine, the linkage is attached to the 8-position of the purine, if B is 7-deazapurine, the linkage is attached to the 7-position of the 7-deazapurine, and if B is pyrimidine, the linkage is attached to the 5-position of the pyrimidine.

15

5. A labeled polynucleotide containing a nucleotide having the formula:



20

wherein:

D is a dye compound of Claim 1 or Claim 2;

B is a 7-deazapurine, purine, or pyrimidine nucleotide base;

$Z_1$  is selected from the group consisting of H and OH;

$Z_2$  is selected from the group consisting of H, OH,  $OPO_3$ , and Nuc, wherein  
25 Nuc and the nucleoside are linked by a phosphodiester linkage or analog thereof, the linkage being attached to the 5'-position of Nuc;

$Z_3$  is selected from the group consisting of H,  $PO_3$  or phosphate analogs, and Nuc, wherein Nuc and the nucleoside are linked by a phosphodiester linkage or  
30 analog thereof, the linkage being attached to the 3'-position of Nuc;

wherein when B is a purine or 7-deazapurine, the sugar moiety is attached at the N<sup>9</sup>-position of the purine or deazapurine, and when B is pyrimidine, the sugar moiety is attached at the N<sup>1</sup>-position of the pyrimidine;

wherein the linkage linking B and D is attached to D at one of positions R<sub>1</sub>-  
5 R<sub>18</sub> or X<sub>1</sub>-X<sub>3</sub>; and

wherein if B is a purine, the linkage is attached to the 8-position of the purine, if B is 7-deazapurine, the linkage is attached to the 7-position of the 7-deazapurine, and if B is pyrimidine, the linkage is attached to the 5-position of the pyrimidine.

10

6. A method of polynucleotide sequencing comprising the steps of:  
forming a mixture of a first, a second, a third, and a fourth class of  
polynucleotides such that:

each polynucleotide in the first class includes a 3'-terminal  
15 dideoxyadenosine and is labeled with a first dye;

each polynucleotide in the second class includes a 3'-terminal  
dideoxycytidine and is labeled with a second dye;

each polynucleotide in the third class includes a 3'-terminal  
dideoxyguanosine and is labeled with a third dye; and

20 each polynucleotide in the fourth class includes a 3'-terminal  
dideoxythymidine and is labeled with a fourth dye;

wherein one of the first, second, third, or fourth dyes is the 4,7-  
dichlororhodamine dye of Claim 1 or Claim 2;

the other of the dyes being spectrally resolvable from the 4,7-  
25 dichlororhodamine dye and from each other;

electrophoretically separating the polynucleotides thereby forming bands of  
similarly sized polynucleotides;

illuminating the bands with an illumination beam capable of causing the  
dyes to fluoresce; and

30 identifying the classes of the polynucleotides in the bands by the  
fluorescence spectrum of the dyes.